

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Claims

1. (Currently amended) A direction finding system comprising ~~incorporating a plurality of antennas (12) characterised in that the system (10) also includes:~~
 - a) a plurality of antennas;
 - a) b) means for determining individual antenna signal strengths;
 - b) c) combining means (SW2, P2, P3, SW3, 18) for deriving combined antenna signal strengths by forming combinations of first and second antenna signals derived from different antennas (12), wherein the second antenna signals are in two sets with signals in one set having a non-zero phase difference relative to signals the other set; and
 - e) d) means for determining at least one emitter bearing from antenna signal strengths.
2. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the means for determining emitter bearing is arranged to derive covariance matrix elements from antenna signal strengths and to determine emitter bearing therefrom.
3. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the means for determining emitter bearing is arranged to derive a relationship between antenna signal strengths and emitter bearing and to determine emitter bearing therefrom.
4. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the relative phase difference is in the range 30 to 120 degrees, and the means (SW1) for determining individual antenna signal strengths and the combining means (SW2, P2, P3, SW3, 18) are arranged to enable successive signal strengths to be derived in successive steps.

5. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the relative phase difference is substantially 90 degrees.
6. (Currently amended) A direction finding system according to Claim 5 ~~characterised in that~~ wherein the combining means (~~SW2, P2, P3, SW3, 18~~) is arranged to combine antenna signals with equal gain magnitude and with equal and unequal phase.
7. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the combining means incorporates phase shifting means (~~P3~~) switchable into and out of an antenna signal path.
8. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein the combining means incorporates an adder (~~18~~) having two inputs both switchably connected to individual signal paths extending to respective antennas (~~12~~).
9. (Currently amended) A direction finding system according to Claim 1 ~~characterised in that~~ wherein:
 - a) the means for determining individual antenna signal strengths comprises a first multipole switch (~~SW1~~) having input poles (~~b, c, d, e~~) connected to receive signals from respective antennas (~~12~~);
 - b) the combining means (~~SW2, P2, P3, SW3, 18~~) incorporates a second multipole switch (~~SW2~~) having input poles (~~b, c, d, e~~) connected to receive signals from respective antennas (~~12~~) and a third multipole switch (~~SW3~~) for switching phase shifting means (~~P3~~) into and out of an antenna signal path extending via the second multipole switch (~~SW2~~); and
 - c) the combining means (~~SW2, P2, P3, SW3, 18~~) also incorporates adding means (~~18~~) for combining signals, the adding means being arranged to add an antenna signal in a first signal path extending via the first multipole switch (~~SW1~~) to another antenna signal in a second signal path extending via the second and third multipole switches (~~SW2, SW3~~).

10. (Currently amended) A method of direction finding using a plurality of antennas ~~(12)~~ ~~characterised in that the method incorporates~~ comprising the steps of determining:
- a) individual antenna signal strengths;
 - b) combined antenna signal strengths by forming combinations of first and second antenna signals derived from different antennas ~~(12)~~, wherein the second antenna signals are in two sets with signals in one set having a non-zero phase difference relative to signals the other set; and
 - c) at least one emitter bearing from antenna signal strengths.
11. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein the step of determining emitter bearing is implemented by deriving covariance matrix elements from antenna signal strengths and determining emitter bearing therefrom.
12. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein the step of determining emitter bearing is implemented by deriving a relationship between antenna signal strengths and emitter bearing and determining emitter bearing therefrom.
13. (Currently amended) A method according to Claim 10 ~~characterized in that~~ wherein the relative phase difference is in the range 30 to 120 degrees and successive signal strengths are determined in successive steps.
14. (Currently amended) A method according to Claim 13 ~~characterized in that~~ wherein the relative phase difference is substantially 90 degrees.
15. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein the step of forming combined antenna signal strengths combines antenna signals with equal gain magnitude and with equal and unequal phase.
16. (Currently amended) A method according to Claim 12 ~~characterized in that~~ wherein the step of forming combined antenna signal strengths includes switching a phase ~~shifting means (P3)~~ shift into and out of an antenna signal path.

17. (Currently amended) A method according to Claim 12 ~~characterised in that~~ wherein the step of forming combined antenna signal strengths includes adding signals in signal paths extending switchably to different antennas (12).
18. (Currently amended) A method according to Claim 10 ~~characterised in that~~ wherein:
- a) the step of determining individual antenna signal strengths comprises switching signals from antennas (12) via a first path; and
 - b) the step of forming combined antenna signal strengths incorporates:
 - i) switching signals from antennas (12) via a first path for combining;
 - ii) switching signals from antennas (12) via a switch selectable second path or a third path for combining, the third path being arranged to phase shift antenna signals therein relative to antenna signals in the second path; and
 - iii) adding a first path antenna signal to second and third path antenna signals individually.
19. (New) A method according to Claim 11 wherein:
- a) the step of determining individual antenna signal strengths comprises switching signals from antennas via a first path; and
 - b) the step of forming combined antenna signal strengths incorporates:
 - i) switching signals from antennas via a first path for combining;
 - ii) switching signals from antennas via a switch selectable second path or a third path for combining, the third path being arranged to phase shift antenna signals therein relative to antenna signals in the second path; and
 - iii) adding a first path antenna signal to second and third path antenna signals individually.
20. (New) A direction finding system incorporating:
- a) a plurality of antennas;
 - b) measuring apparatus for determining individual antenna signal strengths;
 - c) a combining circuit for deriving combined antenna signal strengths by forming combinations of first and second antenna signals derived from different antennas,

wherein the second antenna signals are in two sets with signals in one set having a non-zero phase difference relative to signals the other set; and

- d) digital signal processing apparatus for determining at least one emitter bearing from antenna signal strengths.